

SOME NEW CADDIS FLIES (TRICHOPTERA) FROM THE WESTERN CAPE PROVINCE — II

By

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(With 4 figures in the text)

INTRODUCTION

This is the second paper in the present series, in which new species of caddis flies from the Western Cape (mainly from the Great Berg River) are being described. The imagos of some new Leptoceridae are described in this paper; their immature stages will be described in Part III of the series.

Methods and other introductory matter have been given in Part I (Scott, 1955). All drawings for text-figures 2-4 were made to the same scale with the aid of *camera lucida* attachments (in the case of wings a binocular stereoscopic microscope was used at a magnification of 12.5 diameters; in the case of genitalia specimens cleared in a mixture of parachlorophenol and chloral hydrate were drawn at a magnification of 80 diameters, using a research microscope). For text-figure 1 the wings were drawn to a smaller scale as the species is larger. The wing notation and the terminology used in the description of genitalia are those employed by Mosely and Kimmins (1953). Holotypes will be lodged in the South African Museum; paratypes will be sent to the British Museum (Natural History).

Detailed descriptions of the habitats of the larvae of the new species will be found in Harrison and Elsworth (in press, 1958) and Harrison (in press, 1958).

Grateful thanks are again due to the Council for Scientific and Industrial Research for financial assistance in the form of a Senior Bursary, which has made this work possible. The author would also like to express her gratitude to Dr. Kimmins of the British Museum (Natural History) for helpful comments, as well as to Mr. A. D. Harrison of the Council for Scientific and Industrial Research, Dr. K. H. Barnard of the South African Museum, and Professor J. H. Day of this Department.

DESCRIPTION

Genus ATHRIPSODES Billberg

Billberg, 1820, *Enum. Ins. Mus. Billberg*: 94.

Milne, 1934, *Stud. N. Amer. Trich.*, 1: 18.

Ross, 1938, *Ill. Nat. Hist. Surv. Bull.*, 21: 155-7

Kimmins, 1949, *Entomologist*, LXXXII, No. 1036: 201-4

= *Leptocerus* auctt. nec Leach

Athripsodes prionii sp. n.

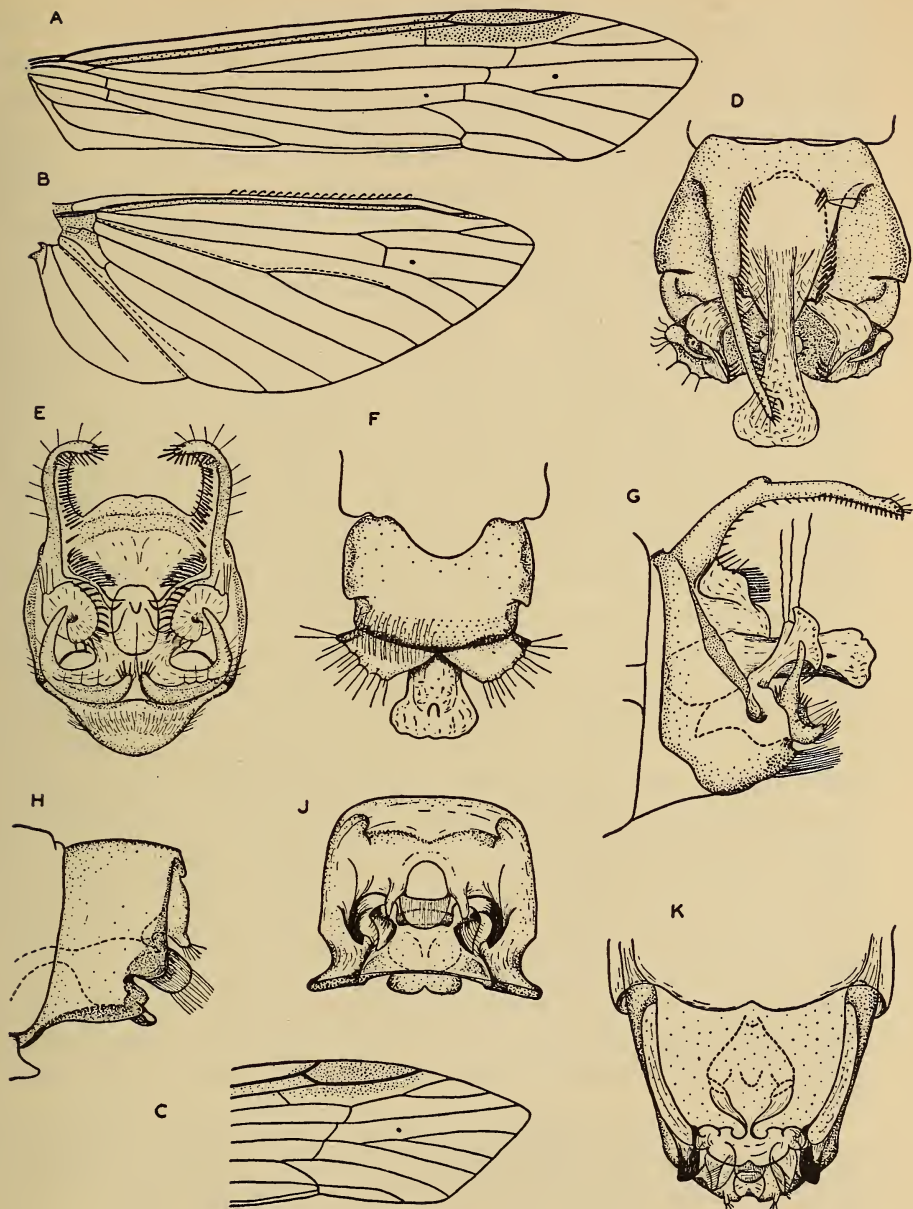
Fig. 1, A-K

A brownish species with wide hind-wings and distinctive rather complex male genitalia bearing numerous short orange-coloured spines; inferior appendages trilobed. The larvae are swimmers; older larvae live in cases made from dead palmiet leaves (*Prionium serratum* (L.f.) Drège), whence the trivial name is derived.

Imago (in alcohol). *Head*: light chestnut brown with mingled brown and yellow setae; antennae annulate brown and yellowish; eyes black. *Maxillary and labial palps* fuscous, covered with yellowish pubescence. *Thorax*: chestnut-brown, mesonotum with short recumbent yellowish setae covering the mid-dorsal area, flanked on each side by a double line of long erect setae; sternites light chestnut; membranous parts pale yellow. *Legs*: tibial spurs 2, 2, 2; the anterior pair short, the second and third pairs long; inner spur of second and third pairs considerably longer than outer. Femora and tibiae yellow-brown; tarsi, particularly of forelegs, somewhat darker. *Abdomen* pale yellow, tergites brownish.

Wings: ♂ 9.0-9.5 mm.; ♀ 8.5 mm. (fig. 1 A-C). ♂ fore-wing: membrane brownish, darker and thickened along R and Sc, particularly in the region of the pterostigma; a slight fold between R and Sc. Pubescence brownish with a slightly brindled appearance due to an admixture of grey hairs; a brown patch over the wing-spot; a short dark fringe along the posterior border; forks 1 and 5 present (1, 3 and 5 in ♀); stalk of fork 1 about half length of R₂. ♂ hind-wing: fawn, thinly pubescent, a slight fold just above Cu₁; broadest at base, much broader than fore-wing; folded under along 2A; fringe short except along turned-in portion where it is very long and silky, there are also long hairs springing from 3A and from the wing between 3A and the margin; Sc is thickened and there is a thickened patch at the base of the wing; forks 1 and 5 present, stalk of fork 1 approximately twice length of R₂; a false vein present between 1A and 2A. ♀ as ♂, excepting that in fore-wing stalk of fork 1 is sub-equal to R₂ and fork 3 is present; the hind-wing though broad is not as broad as in the ♂.

Genitalia: ♂ (fig. 1 D-G). The ninth segment is narrow dorsally, broad ventrally, the lateral margins forming short side-pieces; the apical margin is produced to form a pair of long preanal (superior) appendages, fringed ventrally

FIG. 1. *Athripsodes prionii* sp. n.

A, B, fore- and hind-wings of ♂. C, tip of fore-wing of ♀. D, E, F, G, dorsal, posterior, ventral and lateral views of ♂ genitalia (in D the right dorsal process is omitted and in E the tip of the penis). H, J, K, lateral, posterior and ventral views of ♀ genitalia.

with stout orange-coloured spines and narrowing abruptly almost midway. Between these appendages the tenth segment forms an oval membranous dorsal plate, produced downwards laterally as a thin flange on each side of the penis; each flange bears a brush of strong orange spines. The penis is stout, unarmed, with an expanded membranous tip, and appears to have thin chitinous lower penis-covers closely adhering to its ventral side. The paired claspers (inferior appendages) are trilobed. The lower lobe arises near the mid-ventral line below the penis, and is somewhat bowl-shaped, with an irregular, setose margin; it curls inwards to end in a tuft of orange spines beneath the penis, and outwards where it is produced upwards to form the second, lateral, lobe, a narrow sinuous finger-like projection. The third branch arises from the base of the first, as a tube which opens out apically into a flattened trumpet-like expansion; this curls inward, and its inner margin is armed with 10-12 stout claw-like orange spines; near the apex of the trumpet is a small projection bearing several very long colourless setae, and there are a few similar setae on the upper corner of the main lobe. The shape of the claspers is somewhat reminiscent of some *Triaenodes* species, but the wing neuration is that of *Athripsodes*. The ninth segment from beneath has a U-shaped excision along its anterior margin, paired lateral projections, and a dense band of hairs along the posterior edge.

Genitalia: ♀ (fig. 1 H, J, K). Sternite of eighth segment modified to form a flat sub-genital plate with lateral margins expanded as chitinous flaps (these form an angle of about 45° with the ventral surface of the body and are foreshortened in ventral view); through this plate the vagina can be seen in a cleared specimen. Sternite of eighth segment separated from ninth by a bilobed transverse flap of thin chitin which is connected to the lateral flaps of the eighth by a spoon-shaped chitinized lobe on each side. The ninth sternite consists of an oval flattened area flanked by a pair of trilobed setose cerci; lateral to these the margins form thickened chitinous flaps (in posterior view these are seen to curl round the cerci); between the ninth and tenth sternites is a transverse chitinous bar, and posterior to the bar a small semicircular flap. Ninth tergite normal, slightly extended and curled over posteriorly. Tenth segment small; appears to have a central opening surrounded by a thickened margin and flanked by a pair of small cerci tipped with a few hairs; this opening appears to connect dorsally with the vaginal opening in the single ♀ available.

The species is easily separable from other African species of *Athripsodes* by the very characteristic male genitalia, particularly the strong armature of orange-coloured spines and the trumpet-shaped lobe of the claspers.

Locality: Palmiet River, Elgin (A.D.H.), November 1952, 2 ♂♂, 1 ♀, bred out from larvae in the laboratory. Larvae were collected from Elgin in October and November, and from the Great Berg River at Assegaibos, Driefontein, Groot Drakenstein and Bridgetown (April to October).

Athripsodes bergensis sp. n.

Fig. 2 A-K

A small greyish insect with strongly striped front legs and annulate antennae; the larvae are black-headed crawlers living in long slender cases made from coarse sand grains, to which sticks or bits of charcoal are often attached. The trivial name is taken from the Great Berg River, in Zone IIIA of which the larvae abound.

Imago (description from dry, freshly killed insects, made before preservation in alcohol). Sexes similar, but ♀ slightly smaller than ♂. *Head*: blackish, with strong white or greyish hairs; antennae with basal part annulate cream and black, distal part grey; eyes black. *Maxillary and labial palps* black with grey pubescence. *Thorax*: black, pruinose, mesonotum with short, recumbent white setae on mid-dorsal area, flanked on each side by erect black setae; sternites blackish, pruinose. *Legs*: tibial spurs 2, 2, 2, sizes as in *A. prioni*; anterior pair of legs: femora and tibiae black, with black setae on inner side and white setae on the outer, tarsi annulate black and white, spurs whitish; middle pair of legs: similar but duller, femora browner, spurs pale fawn with white pubescence; hind legs yellowish, with slightly darker annulations on tarsal joints, pubescence whitish. The legs of different specimens vary somewhat in intensity of colouration. *Abdomen* green.

(Specimens in alcohol: general appearance brownish; thorax sepia; wings mottled brown and grey; legs yellowish, markings dull and hardly visible; antennae still conspicuously annulate.)

Wings: ♂ 5.5–6.5 mm. (Elgin specimen 7.5 mm.); ♀ 5.5–5.6 mm. (fig. 2 A–C). Fore-wing ♂: brindled dark grey and white; membrane brownish, darker and thickened along Sc and R and at the pterostigma, with clear streaks along M and Cu₂ and 1A, and sometimes a few clear spots as well; forks 1 and 5 present (1, 3 and 5 in ♀); stalk of fork 1 approximately two-thirds of length of R₂. Hind-wing ♂: membrane dusky, with sparse brownish pubescence, broadest in middle, broader than fore-wing, a small portion folded under along 2A; fringe long and silky, particularly along lower margin of wing and along turned-in portion; Sc thickened and a thickened patch at base of wing. Forks 1 and 5 present, fork 1 small, stalk five to six times length of R₂. (In ♀ R₂ is very short and stalk is about six times length of R₃.)

Genitalia: ♂ (fig. 2 D–G). Ninth segment much narrower dorsally than ventrally; side-pieces slightly produced and with heavily chitinized posterior margins; ventral plate ends posteriorly in a short triangular point. The whole ninth segment is covered with microtrichia, which are slightly longer on the ventral process than elsewhere. Dorsal plate of tenth segment wide, bilobed, setose; from it a broad median dorsal process projects backwards; this process is irregularly sub-triangular as seen from above and is somewhat folded proxi-

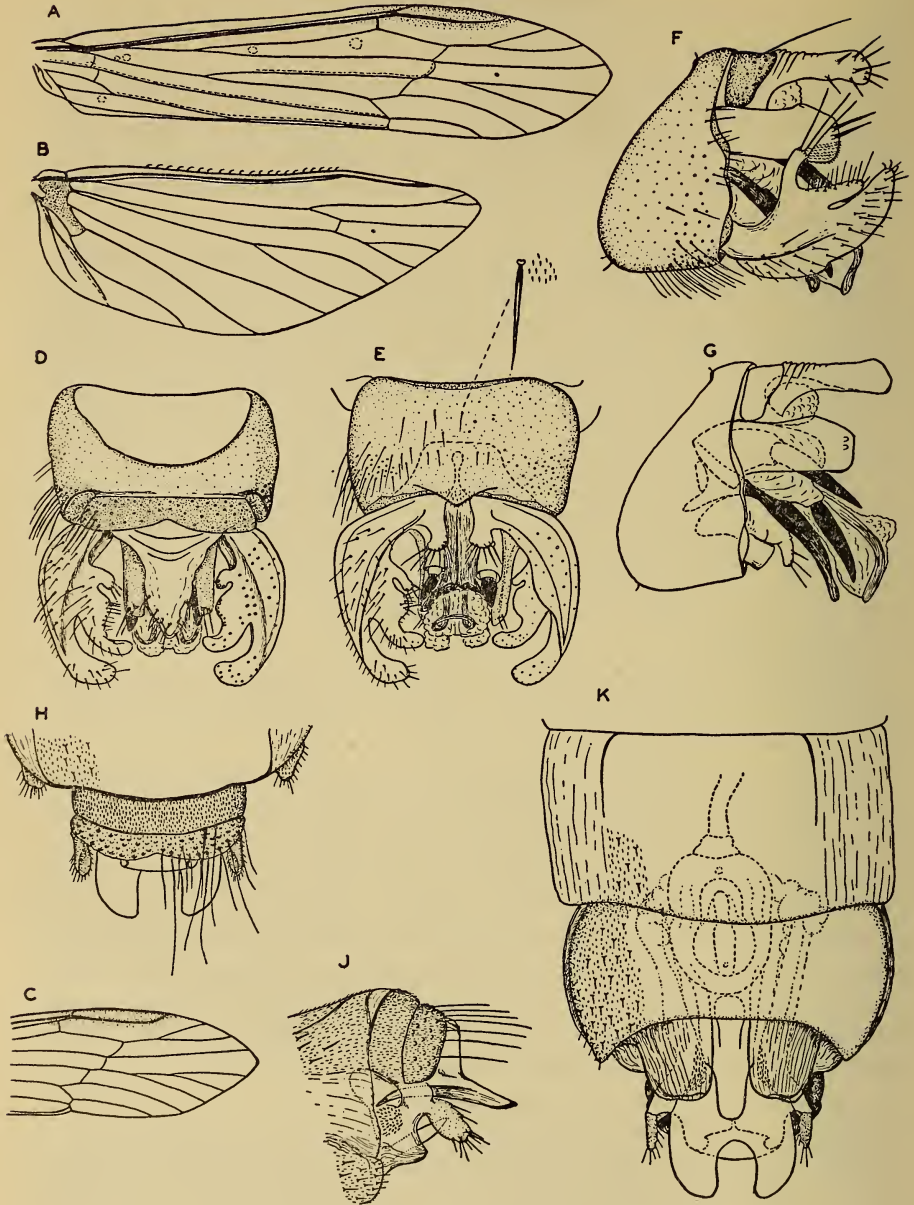


FIG. 2. *Athripsodes bergensis* sp. n.

A, B, fore- and hind-wings of ♂. C, tip of fore-wing of ♀. D, E, F, dorsal, ventral and lateral views of ♂ genitalia (seta and microtrichia further enlarged to show relative sizes). G, lateral view of ♂ genitalia with clasper removed. H, J, K, dorsal, lateral and ventral views of ♀ genitalia.

mally, the distal end bears a few stout bristles. The dorsal process is hollowed out ventrally and beneath it lies a complex set of processes which seem from their basal attachments to represent upper penis-covers; these include a pair of stout lateral processes each of which bears a pair of strong bristles and a ventro-lateral patch of fine pubescence; also two membranous lobes apparently lying one above the other, the lower one just above the penis, the upper one partly within the hollow of the dorsal process. On each side of these, mesial to the lateral processes, is a stout socketed spine. The penis is stout and membranous, with a chitinized sclerite strengthening the tip; on each side of it is another socketed spine, and below it, closely applied to it, a pair of chitinized lower penis-covers. Each of the four socketed spinous processes appears to consist of a bundle of fused setae. The claspers are trilobed as seen in lateral view, with a stout keeled base covered with microtrichia. The anterior branch is slender, with a truncate tip bearing three long setae; the middle branch as seen in dorsal view consists of two rounded inwardly projecting setose lobes; the posterior branch is the stoutest and also curls inwards. In ventral view it is seen that the claspers each have an additional basal process just beneath the penis.

Genitalia: ♀ (fig. 2 H, J, K). Seventh segment normal; eighth segment normal, but with the posterior corners of the sternite slightly produced; in a cleared specimen the vaginal structure is visible through these two segments. Ninth segment with finely pubescent tergite; sternite subdivided into three: a pair of finely folded lateral lobes, and a narrow tongue-like central plate. Tenth segment with a bilobed setose dorsal plate very like that of the ♂, posterior to this the tergite narrows and curls downwards; it is joined by vertical side-pieces to a flat rounded sternite with a large U-shaped apical excision. There is also a pair of small leaf-like cerci; each of these arises from a bridge-like side-piece (probably belonging to the ninth segment) anterior to which there is a patch of small fine chitinous points.

This species is easily separated from other African species so far described by the genitalia, both ♂ and ♀.

Locality: Imagos: Great Berg River near Driefontein (A.D.H., 1 ♂, 2 ♀♀, bred out from larvae, March 1953; K.M.F.S., 7 ♂♂, 6 ♀♀, bred out from larvae and pupae, October–December, 1956); Palmiet River, Elgin (A.D.H., 1 ♂, bred out from larva, November 1952). Larvae: collected from the Great Berg River near Driefontein and Groot Drakenstein from March to October.

Athripsodes tuckeri Barnard ? var.

Fig. 3 A–J

This may be a distinct species, or only a variety of *Athripsodes tuckeri* Barnard (1934). It is a small species with male genitalia close to those of

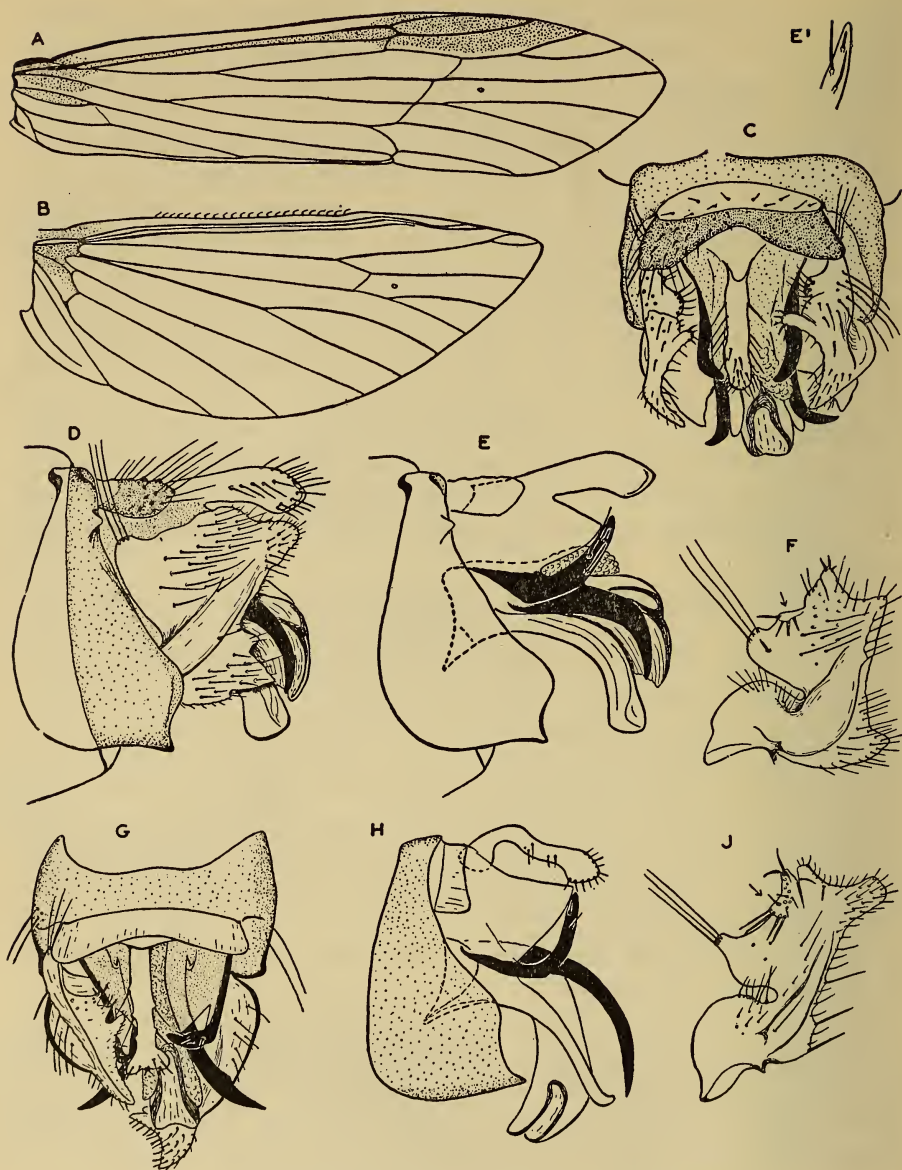


FIG. 3. *Athripsodes tuckeri* Barnard ? var. and *A. tuckeri* Barnard

A, B, fore- and hind-wings of ♂, *A. tuckeri* ? var. C, D, dorsal and lateral views of ♂ genitalia, *A. tuckeri* ? var. E, lateral view of ♂ genitalia, *A. tuckeri* ? var. (clasper removed to show penis). E₁, tip of spinous process to show spinules. F, left clasper of ♂ from another specimen of *A. tuckeri* ? var., to show variation in shape (projection marked by arrow seen by transparency). G, H, J, dorsal and lateral views of ♂ genitalia of *A. tuckeri*, and clasper of another specimen (from Jonkershoek); in G right clasper is out of place and only the lower part has been shown; in H the clasper has been removed; in J the projection marked by the arrow is seen by transparency.

A. tuckeri, the most conspicuous differences being seen in the shape of the dorsal plate and dorsal process of the tenth segment.

♂ *imago* (in alcohol). *Head*: face yellowish, vertex light brown; antennae annulate brown and yellow basally, distal portion dusky; eyes black. *Palps* fuscous. *Thorax*: pronotum yellowish, mesonotum chestnut, with setae arranged as in *A. prionii*, scutellum outlined in darker brown, metanotum paler brown, sternites brownish-yellow. *Legs*: tibial spurs 2, 2, 2; legs yellowish-brown, tarsi of fore-legs darkened distally, particularly along the anterior side. *Abdomen* pale yellow.

Wings: ♂ 6.5–7.5 mm. (fig. 3 A, B). ♂ fore-wing chequered brown and gold, giving a golden-brown appearance; there is a whitish spot at the arculus and a dark streak along the margin from the arculus to the apex of the wing. Fringe short. Membrane brownish, darkened and slightly folded along R and Sc, and thickened at the pterostigma. Forks 1 and 5 present; stalk of fork 1 subequal to R₂. Hind-wing sparsely pubescent, brownish, broadest in middle, broader than fore-wing, folded under along 2A. Fringe short except along folded-in portion. Sc thickened and a thickened area at base of wing; forks 1 and 5 present, fork 1 small, stalk five to six times length of R₂.

Genitalia: ♂ (fig. 3 C–F). Ninth segment narrow dorsally, broad ventrally; side-pieces somewhat produced, each with a small projection near the dorsal side; sternite ending in a small rounded point. Tenth segment with a bilobed transverse dorsal plate, posterior to which is a stout median dorsal process armed with colourless bristles; in dorsal view the process is slightly sinuous with a rounded (not expanded) tip, in lateral view it is a blunt hatchet shape. Below the dorsal process, and attached to it for the proximal half of its length, are paired upper penis-covers which extend downwards lateral to the penis, each ending ventrally in a strong curved spinous process with two or three spinules near its tip. Under the upper penis-covers is a median membranous hood. The penis is stout, the membranous part folded and the tip strengthened with a spur-shaped chitinous bar; on each side of it there is a stout down-curved spine or titillator, and below it are paired lower penis-covers. The claspers are strong, leaf-shaped, with a stout supporting flange; dorsal margin formed of five small setose lobes, of which the central three usually project inwards and are not visible in lateral view; one or more triangular lobes at the postero-ventral corner.

Remarks. The main differences between this variety and *Athripsodes tuckeri* Barnard lie in the shape of the transverse dorsal plate and of the median dorsal process (cf. fig. 3 C, D and E with G and H); note also the extent of attachment of the dorsal process to the upper penis-covers and the thickness of the spinous processes. These differences were constant in the three males available, and appear to be sufficiently marked to warrant a full description being given, in

case this should prove to be a new species when more material is available. The figures of *A. tuckeri* given for comparison were drawn from type material kindly loaned by the South African Museum (fig. 3 G–J). The claspers also show differences, but these are less marked as different specimens show a considerable amount of variation; on the whole however those of the variety seem to be consistently wider and stronger than those of *A. tuckeri*. The number of spinules on the spinous processes varies, in both, from one to three. Wings are similar, though in the hind-wing of *A. tuckeri* fork 1 may be minute or absent.

Should this eventually prove only to be a variety, the figures given will serve as an indication of the range of variation within the species.

Locality: Great Berg River, Driefontein (A.D.H. and K.M.F.S., December 1952 and January 1955, in each case one ♂, bred out in the laboratory from material collected from backwaters). Also one ♂ imago caught flying at dusk at Groot Drakenstein, lower down on the Great Berg River (A.D.H., November 1953).

Genus LEPTECHO Barnard

Barnard, 1934, *Trans. Roy. Soc. S. Afr.*, XXI: 349

Barnard, 1940, *Ann. S. Afr. Mus.*, XXXII: 647.

Kimmins, 1956, *Trans. R. ent. Soc. Lond.*, 108: 117–46

The new species described below falls into the genus *Leptecho* Barnard according to the key given by Dr. Kimmins (1956). The only difference from *Athripsodes* appears to be the absence of fork 3 in the ♀ fore-wing, the wing neuration being similar in both ♀ and ♂, and it seems very probable, as Dr. Kimmins suggests, that *Leptecho* will eventually have to be sunk in *Athripsodes*. In the meantime, however, the species described here joins Barnard's two species, *L. scirpi* and *L. lupi*, in the genus *Leptecho*.

Leptecho helicotheca sp. n.

Fig. 4 A–N

A fairly small, slender, grey caddis fly with annulate antennae. The ♂ is larger than the ♀ and has considerably longer antennae, but the sexes are similar in colouring. The larvae are crawlers with bright brown heads, living in neat snail-shaped cases made of sand grains. The larvae resemble *Athripsodes* larvae, but the cases are remarkably similar to the larval cases made by species of *Helicopsyche*; the pupal cases however are straight, not coiled.

Imago (description made from dry, freshly killed insects, before preservation in alcohol). *Head*: face brownish; vertex and back of head leaden in colour (actually dark brown to black but heavily pruinose), setae mingled white and grey; eyes brown to black; antennae very long (about one and a half times

body length in ♀♀, more than twice body length in ♂♂), proximally annulate black and white, distally grey. Palps leaden with silvery pubescence. *Thorax*: tergites leaden, with silvery-white hairs; pleura and sternites brownish, pruinose, with sparse silvery hairs. *Legs*: yellowish with silvery pubescence except as indicated: fore-legs: lower part of anterior side of femora and anterior side of tibiae, grey, tarsi black and white annulate; mid-legs: anterior side of tibiae and tarsi greyish, tarsi with faint annulations; hind legs: posterior side of tibiae and tarsi greyish. (Leg colouring varies somewhat in intensity in different specimens.) Spurs on tibiae as in *Athripsodes*: 2, 2, 2, and of similar proportions. *Abdomen* dark green, pruinose, genitalia yellowish.

Wings: ♂ 7.5–8.0 mm.; ♀ 5.5–6.0 mm. (fig. 4 A, B). ♂ fore-wing: membrane yellowish-brown, iridescent, densely covered with brownish-grey and silvery hairs (in most specimens the proximal half of the wing is browner and the distal half more silvery, in one ♂ however the dorsal half was more silvery and the ventral half browner); a silvery spot at the arculus; fringe short, brindled. Forks 1 and 5 only present in both ♂ and ♀; Sc, R and the pterostigma slightly thickened; stem of fork 1 sub-equal to R_2 . ♂ hind-wing: membrane pale fawn with sparse silvery pubescence; fork 5 only present in both ♂ and ♀; hind-wing broader than in ♀, in both sexes the wing is turned under along 3A and this portion bears a very long silky fringe.

(Specimens in alcohol: general appearance light golden-brown with chestnut head and thorax; antennae annulate yellow and brown; wings brownish-grey brindle; legs yellowish.)

Genitalia: ♂ (fig. 4 C–J). Ninth segment somewhat narrower dorsally than ventrally, bearing long setae, specially on the sternite; side-pieces with strongly chitinized posterior margins. The tenth segment comprises a membranous dorsal plate terminating in a small, oblong, median process tipped with three long setae, and, lateral to the dorsal plate, a pair of large, finely pubescent lobes studded with sword-like stalked setae. The median projection overlies a membranous hood, lateral to which are paired upper penis-covers each bearing several stout setae and with an obliquely truncate apex. The penis itself is short, with an expanded bifid tip and a horseshoe-shaped chitinous support; beneath it there are short lower penis-covers with rounded down-curved ends. The claspers are short and strong, trilobed in lateral view, with a slight ventro-lateral keel. In dorsal or ventral view it is seen that the lower lobes of the claspers are incurved, setose, with sinuous inner edges and with a small inwardly projecting tooth near the tip. The setose median lobes project inwards; the upper lobes are truncate and tipped with two or three long setae.

Genitalia: ♀ (fig. 4 K–N). Eighth segment slightly flattened ventrally; vagina visible through this in cleared specimens. Ninth segment with a rounded setose dorsal plate; sternite slightly hollowed forming a sub-genital plate with curved lateral margins and a flat, bifid, backwardly projecting central plate.

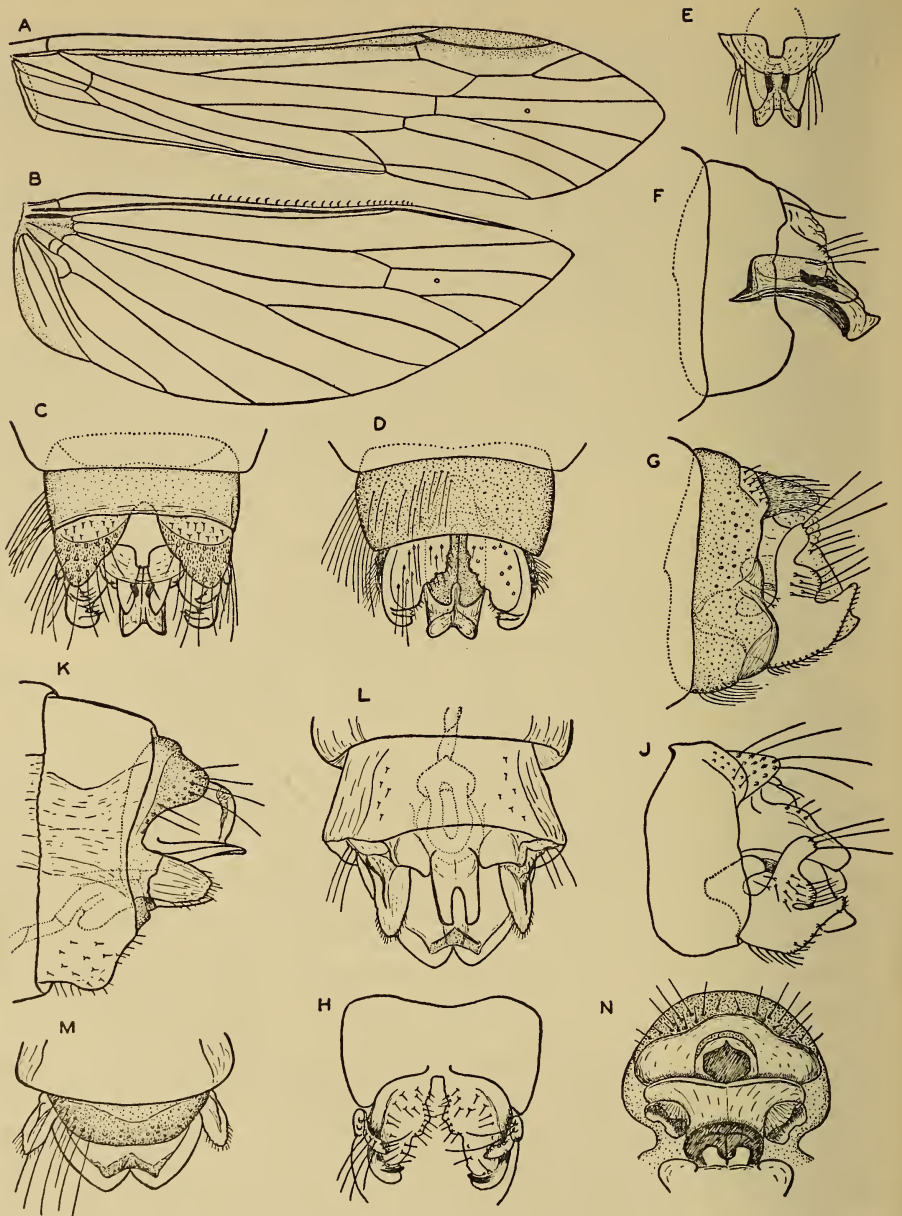


FIG. 4. *Leptecho helicotheca* sp. n.

A, B, fore- and hind-wings of ♂. C, D, dorsal and ventral views of ♂ genitalia. E, detail of upper penis-covers etc., dorsal view. F, G, lateral views of ♂ genitalia (F with clasper removed). H, dorsal view of claspers. J, lateral view of ♂ genitalia (another specimen to show variation in shape of clasper and detail of upper penis-cover). K, L, M, N, lateral, ventral, dorsal and posterior views of ♀ genitalia (in L the chitinous bar of the hood is seen by transparency).

Tenth segment hood-like, with a posterior opening strengthened by a chitinous bar which appears semicircular from behind but W-shaped in dorsal view. This hood is joined laterally to a flat, bilobed transverse plate which is larger than the hood but transparent and therefore difficult to see. The tenth segment bears two large, slightly hairy cerci, which, together with the flat transverse plate and the small bifid process, surround the genital opening.

Remarks. This species can easily be distinguished from *Leptecho scirpi* and *L. lupi* by the structure of the male genitalia, in particular by the absence of tillators, the shape of the claspers and the dorsal plate, and the existence of a median dorsal process.

Locality: Great Berg River near Driefontein (2 ♂♂ March 1951, A.D.H.; 2 ♂♂, 2 ♀♀ May 1957, K.M.F.S.; all bred out from larvae. Larvae were also collected there from November to March.) Great Berg River, Groot Drakenstein (♂♂ and ♀♀ collected in June 1951, A.D.H.).

SUMMARY

Three new species of caddis (Trichoptera: Leptoceridae) are described from South Africa: *Athripsodes prionii*, *A. bergensis* and *Leptecho helicotheca*; also a variety of *Athripsodes tuckeri* Barnard.

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